



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Frank Richter et al.
Serial No.: 08/713,905
Filed: Sept. 13, 1996
For: PROCESS FOR THE PRODUCTION
OF ETHER ISOCYANATES
Art Unit: 1711
Examiner R. Sergeant

#231 Declaration
10/10/02

DECLARATION

I, Herbert Stutz, residing at Schulstrasse 81, 41541 Dormagen, Germany, declare as follows:

- 1) that I have studied chemistry at the University of Saarbruecken from 1967 – 1978;
- 2) that I received the degree of doctor rer. nat. at the University of Saarbruecken in the year of 1978;
- 3) that since 1979 I have been employed by Bayer AG;
- 4) that I am not one of the inventors of U.S. Patent Application Serial No. 08/713,905, filed May Sept. 13, 1996;
- 5) that, however, I am an expert in gas phase phosgenation of amines and have been active in this field for 22 years;
- 6) that I am familiar with the teaching of the present U.S. Patent Application (U.S. Serial Number 08/713,905), the Prior Art cited during prosecution and the essentials of the decision of the Board of Appeals dated August 30, 2001.

And I declare as follows:

1. That Lehmann et al (U.S. Patent 3,267,122) does not teach anything with respect to a gas phase process for the production of isocyanates.

2. That I, as one skilled in the art of gas phase phosgenation, would not consider the teachings of Lehmann et al to be applicable to the gas phase phosgenation of ether (poly)amines because it was well known at the time the present invention was made that phosgenation of ether (poly)amines resulted in the formation of a large quantity of unwanted product(s) due to cleavage. For example, at page 83 of Annalen der Chemie, Band 562 (copy enclosed), it is stated:

..., methoxy propylamine with the reaction of phosgene in toluene as a thinning agent produces a mixture of methoxypropyl isocyanate and chloropropyl isocyanate **which cannot be separated by fractioned vacuum distillation**. Under the test conditions, the methoxyl residue was replaced with chlorine. (emphasis added) *group*

Further, at page 104 of Annalen der Chemie, it is reported that pure chlorine propyl isocyanate (i.e., an isocyanate in which in no ether oxygen is present) was obtained in high yield under the described experimental conditions.

It is also stated at page 87 of Annalen der Chemie that:

Ether diamines, which can be obtained from adding acrylic nitrile to bi-functional alcohols and subsequent hydration, such as the ethylene glycol diamine dipropyl ether $\text{NH}_2 \cdot (\text{CH}_2)_3 \cdot \text{O} \cdot \text{CH}_2\text{CH}_3 \cdot \text{O} \cdot (\text{CH}_2)_3 \cdot \text{NH}_2$ produces mainly decomposition products while the expected diisocyanates only occur with poor yield.

3. That I would not have expected to be able produce an ether (poly)isocyanate under the conditions required for gas phase phosgenation of the corresponding (poly)amine in view of this recognized cleavage problem and the teachings in the art at the time the present invention was made.

4. That there is no teaching in either the Bischof et al (U.S. 5,516,935) or the Joulak et al (U.S. 5,391,683) disclosure which would lead me to believe that ether (poly)amines could be effectively phosgenated in the gas phase by the disclosed methods.

5. That the statement of Biskup et al (U.S. 5,449,818) that the amines useful in the disclosed process could include ether groups in the hydrocarbon residue would not, alone, lead me to expect that gas phase phosgenation of ether

(poly)amines would produce the desired ether (poly)isocyanate in satisfactory yield, particularly in a process such as that claimed in the present application in which the mean contact time of the phosgene and amine vapors is not limited to 0.5-5 seconds.

6. That I would not have combined the teachings of the Lehmann et al patent with the teachings of the Bischof et al and/or Biskup et al and/or Joulak et al patents in the manner suggested by the Patent Office at the time the present invention was made and that I would not have expected to be able to produce ether (poly)isocyanates with low hydrolyzable chlorine contents in good yield by a gas phase phosgenation process at the time the presently claimed invention was made.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Leverkusen, this 22 day of August, 2002.

Herbert Stutz
Herbert Stutz

s/rmc/lmw0140